WHAT IS CLAIMED IS:

1. A purified nucleic acid molecule encoding a peptide consisting of a motif selected from SEQ ID NOS: 1, 2, 3, or 4.

2. A purified nucleic acid molecule that hybridizes to either strand of a denatured, double-stranded DNA comprising the nucleic acid molecule of claim 1 under conditions of moderate stringency.

3. A recombinant vector that directs the expression of a nucleic acid molecule selected from the group consisting of the purified nucleic acid molecules of claims 1 or 2.

4. A purified polypeptide encoded by a nucleic acid molecule selected from the group consisting of the purified nucleic acid molecules of claims 1 or 2.

5. A purified polypeptide consisting of Motif I (SEQ ID NO:1).

6. A purified polypeptide consisiting of Motif II (SEQ ID NO:2).

7. A purified polypeptide consisting of Motif III (SEQ ID NO:3).

8. A purified polypeptide consisting of Motif III* (SEQ ID NO:4).

9. Purified antibodies that bind to a polypeptide of claim 4.

10. Purified antibodies according to claim 9, wherein the antibodies are monoclonal antibodies.

11. Purified antibodies that bind to a polypeptide of claim 5.

12. Purified antibodies according to claim 11, wherein the antibodies are monoclonal antibodies.

13. Purified antibodies that bind to a polypeptide of claim 6.

14. Purified antibodies according to claim 13, wherein the antibodies are monoclonal antibodies.

15. Purified antibodies that bind to a polypeptide of claim 7.

16. Purified antibodies according to claim 15, wherein the antibodies are monoclonal antibodies.

17. Purified antibodies that bind to a polypeptide of claim 8.

18. Purified antibodies according to claim 17, wherein the antibodies are monoclonal antibodies.

19. A host cell transfected or transduced with the recombinant vector of claim 3.

20. A method for the production of a polypeptide consisting of SEQ ID NOS: 1, 2, 3, or 4, comprising culturing a host cell of claim 17 under conditions promoting expression, and recovering the polypeptide from the host cell or the culture medium.

21. The method of claim 20, wherein the host cell is selected from the group consisting of bacterial cells, parasite cells, and eukaryotic cells.

22. An immunological complex comprising a polypeptide of claim 4 and an antibody that specifically recognizes said polypeptide.

23. A method of detecting a racemase encoded by a nucleotide sequence containing a subsequence encoding a peptide selected from SEQ ID NO: 1, 2, 3, or 4, said method comprising:

(a) contacting the nucleotide sequence with a primer or a probe, which hybridizes with the nucleic acid molecule of claim 1;

(b) amplifying the nucleotide sequence using said primer or said probe; and

(c) detecting a hybridized complex formed between said primer or probe and the nucleotide sequence.

24. A method of detecting a racemase encoded by a nucleotide sequence containing a subsequence encoding a peptide selected from SEQ ID NO: 1, 2, 3, or 4, said method comprising:

(a) contacting the product encoded by a nucleotide sequence racemase with antibodies according to any one of claims 9 to 18; and

(b) detecting the resulting immunocomplex.

25. A kit for detecting a racemase encoded by a nucleotide sequence containing a subsequence encoding a peptide selected from SEQ ID NO: 1, 2, 3, or 4, said kit comprising:

(a) a polynucleotide primer or probe, which hybridizes with the polynucleotide sequence of claim 1; and

(b) reagents to perform a nucleic acid hybridization reaction.

26. A kit for detecting a racemase encoded by a nucleotide sequence containing a subsequence encoding a peptide selected from SEQ ID NO: 1, 2, 3, or 4, said kit comprising:

(a) purified antibodies according to any one of claims 9 or 10;

(b) standard reagents in a purified form; and

(c) detection reagents.

27. An *in vitro* method of screening for an active molecule capable of inhibiting a racemase encoded by a nucleotide sequence containing a subsequence encoding a peptide selected from SEQ ID NO: 1, 2, 3, or 4, said method comprising:

(a) contacting the active molecule with said racemase;

(b) testing the capacity of the active molecule, at various concentrations, to inhibit the activity of the racemase; and

(c) choosing the active molecule that provides an inhibitory effect of at least 80 % on the activity of the racemase.

28. An immunizing composition containing at least a purified polypeptide according to claim 4, capable of inducing an immune response *in vivo*, and a pharmaceutical carrier.

29. A method for detecting a D-amino acid, wherein the method comprises:

(A) providing a reaction medium containing the D-amino acid;

(B) reacting the D-amino acid with a D-amino oxidase with a prosthetic group to form a reduced prosthetic group by oxidative deamination of the D-amino acid with a primary amine or oxidation of the D-amino acid with a secondary amine;

(C) reacting the reduced prosthetic group with oxygen to form hydrogen peroxide; and

(D) detecting the hydrogen peroxide thus formed.

30. The method as claimed in claim 29, wherein the prosthetic group is flavin-adenin-dinucleotide (FAD) or flavin-mononucleotide (FMN).

31. The method as claimed in claim 30, wherein the hydrogen peroxide is detected by reaction with a catalase.

32. The method as claimed in claim 29, wherein the D-amino acid is a D-Proline, D-Tyrosine, D-Valine, D-Threonine, D-Glutamic acid, D-Lysine, or D-Tryptophane.

33. The method as claimed in claim 30, wherein the hydrogen peroxide is detected by reaction with a peroxidase.

34. The method as claimed in any one of claims 29-33, comprising quantifying the D-amino acid in the reaction medium after the formation of the hydrogen peroxide.

35. The method as claimed in claim 29, wherein the reaction medium comprises a biological sample from a subject afflicted with Alzheimer's disease, Parkinson's disease, renal disease, or schizophrenia.

36. The method as claimed in claim 34, wherein the biological sample comprises a fluid or tissue sample from the subject.

37. The method as claimed in claim 34, wherein the biological sample comprises cells from the subject.

38. A method for detecting racemase activity in a reaction medium, wherein the method comprises:

(A) providing a reaction medium containing a D-amino acid specific to the racemase to be detected;

(B) reacting the D-amino acid with a D-amino oxidase with a prosthetic group to form a reduced prosthetic group by oxidation of the D-amino acid;

(C) reacting the reduced prosthetic group with oxygen to form hydrogen peroxide; and

(D) detecting the hydrogen peroxide thus formed;

wherein the detection of hydrogen peroxide indicates racemase activity in the reaction medium.

39. The method as claimed in claim 38 wherein the hydrogen peroxide is detected by reaction with catalase.

40. The method as claimed in claim 38, wherein the hydrogen peroxide is detected with a chromogenic reagent.

41. The method as claimed in claim 39, wherein the chromogenic reagent is orthophenyalaninediamine (OPD), 3,3',5,5'-tetrimethylbenzadine (TMB), or 5-aminosalicyclic acid (ASA).

42. A kit for screening for inhibitors of *Tc*PRAC, wherein the kit comprises:

(A) L-proline, D-proline, and a proline-racemase;

(B) a peroxidase and a substrate of a peroxidase, or a catalase and a reagent sensitive to oxygen;

(C) a D-amino acid oxidase; and

(D) optionally, one or more molecules to be screened for inhibitory activity of *Tc*PRAC.

43. A kit for detecting a D-amino acid in a sample, wherein the kit comprises:

(A) a D-amino acid;

(B) a peroxidase and a substrate of a peroxidase;

(C) a D-amino acid oxidase; and

(D) optionally, a L-amino acid enantiomer as control.

44. A method for detecting a D-amino acid in a sample, wherein the method comprises:

(A) oxidatively deaminating a D-amino acid by reaction with a D-amino acid oxidase in a prosthetic group; and

(B) detecting the hydrogen peroxide generated by the oxidative deamination;

wherein the presence of hydrogen peroxide is indicative of the presence of a D-amino acid in the sample.

45. The method as claimed in claim 43, wherein the D-amino acid is D-Proline, D-Tyrosine, D-Valine, D-Threonine, D-Glutamic acid, D-Lysine, or D-Tryptophane.

46. A method for screening a molecule, which can modulate a racemase activity, wherein the method comprises:

(A) modulating a racemase activity by means of a molecule being tested in the presence of an equimolar mixture of a L- and D-amino acid and of a racemase to be modulated;

(B) oxidatively deaminating the D-amino acid generated in step (A) by means of a D-amino oxidase in a prosthetic group; and

(C) detecting the hydrogen peroxide generated by the oxidative deamination;

wherein modulation of the hydrogen peroxide is indicative of the capability of the tested molecule to modulate racemase activity.

47. The method as claimed in claim 46, wherein said molecule inhibits said racemase activity.

48. The method as claimed in claim 46, wherein said racemase is a proline racemase.

49. The method as claimed in claim 47, wherein said proline racemase is *Tripanosoma cruzi* proline racemase.

50. A molecule identified by a method as claimed in claims 45 to 48.

51. A technological platform and all reagents and devices necessary to perform the method of claims 29 to 41 and 44 to 49.

52. The technological platform as claimed in claim 50, comprising

a) L-amino acid, D-amino acid, and a racemase;

b) a peroxydase and a substrate of a peroxydase, or a catalase and a reagent sensitive to oxygen;

c) a D-amino acid oxidase; and

d) optionally, one or more molecules to be screened for inhibitory activity of said racemase.

53. The technological platform as claimed in claim 51, wherein said racemase is a proline racemase and said L-amino acid and D-amino acid are L-proline and D-proline, respectively.

54. A molecule inhibiting a proline racemase containing a subsequence selected from the SEQ ID NO: 1, 2, 3 or 4.